WIFI+BT Module
IEEE 802.11 a/b/g/n 1T/1R
Model Number: DT3CR1001

Product Description

The DT3CR1001 is a complete 2.4GHz/5GHz WIFI module. This module provides a high level of integration with IEEE 802.11n MAC/ base band /radio and Bluetooth 5.2.The WLAN operation supports 20MHz,40MHz channels for data rates up to 150Mbps. It fully complies with IEEE 802.11 a/b/g/n feature rich wireless connectivity at high standards,delivers reliable,cost-effective, throughput from an extended distance.

Product Features

- ◆ Complies with IEEE 802.11b/g/n for 2.4GHz，IEEE 802.11a/n for 5GHz
- ◆ Bluetooth v5.2
- ◆ One transmit and One receive path(1T1R)
- ◆ Works with all existing network nfrastructure.
- ◆ Capable of up to 128-Bit WEP Encryption.
- ◆ Freedom to roam while staying connected.
- ◆ Operating Systems：Linux, Windows.
- ◆ Low power consumption.
- ◆ Easy to install and configure.
- ◆ USB interface.
- ◆ROHS compliant

Product Specification

Model	WIFI+BT Module
Product Name	DT3CR1001
Standard	802.11 a/b/g/n
Interface	USB
Data Transfer Rate	Up to 150Mbps
Modulation Method	GFSK,n/4-DQPSK,8DPSK(bluetooth) DQPSK,DBPSK,CCK(802.11b) QPSK,BPSK,16QAM,64QAM with OFDM (802.11g) QPSK,BPSK,16QAM,64QAM with OFDM (802.11n) QPSK,BPSK,16QAM,64QAM with OFDM (802.11a)
Frequency Band	BLUETOOTH 2402~2480 MHz WIFI 2.4G: 2412~2462 MHz 5G: 5150~5350MHz, 5470~5725MHz，5725~5850MHz
Operation Mode	Infrastructure
Security	WEP, TKIP, AES, WPA, WPA2
Operating Voltage	3.3V±10%
Current Consumption	＜1000mA
Antenna Type	PIFA
Operating Temperature	-30 ~ 70°C ambient temperature
Storage Temperature	-40 ~ 85°C ambient temperature
Humidity	10 to 90 % maximum (non-condensing)

NOTICE:

◆please keep this product and accessories attached to the places which children can't touch;
◆do not splash water or other liquid onto this product, otherwise it may cause damage;
◆do not put this product near the heat source or direct sunlight, otherwise it may cause deformation or malfunction;
◆please keep this product away from flammable or naked flame;
◆please do not repair this product by yourself. Only qualified personnel can be repaired.

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

According to 996369 D03 section 2.0 INTEGRATION INSTRUCTIONS

2.2

This module has been assessed against the following FCC rule parts: CFR 47 FCC Part 15 C (15.247, DTS and DSS) and CFR 47 FCC Part 15 E (NII). It is applicable to the modular transmitter

2.3

This radio transmitter 2AC23-DT3C has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

The concrete contents to check are the following three points.

1) Antenna type is a PIFA Antenna with no more than 1.72dBi gain at BT/BLE, 1.72 dBi for 2.4 G WIFI ,2.57 dBi gain for 5G WIFI .
2) Should be installed so that the end user cannot modify the antenna
3) Feed line should be designed in 50ohm

Fine-tuning of return loss etc. can be performed using a matching network.
The antenna shall not be accessible for modification or change by the end user.

2.4

The module complies with FCC Part 15.247 / Part 15.407 and apply for Limited module approval.

2.5

Trace antenna designs: applicable.
Any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify the module grantee that they wish to change the antenna trace

design. In this case, a Class II permissive change application is required to be filed by the grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

The device must be professionally installed.
The intended use is generally not for the general public.
It is generally for industry/commercial use.
The connector is within the transmitter enclosure and can only be accessed by disassembly of the transmitter that is not normally required.
The user has no access to the connector.
Installation must be controlled.
Installation requires special training.

2.6
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

2.7
The following antennas have been certified for use with this module.
Only antennas of the same type with equal or lower gain may also be used with this module.
Other types of antennas and/or higher gain antennas may require the additional authorization for operation. The installer should use unique antenna connector and Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device. The manufacturer of module will inform installer to meet with the FCC part 15.203 in the warning part.

Antenna Specification list below:
BLE/BT:

Antenna	Frequency (MHz)	Antenna Type	MAX Antenna Gain (dBi)
1	2402-2480	PIFA	1.72

2.4 G wifi:

Antenna	Frequency (MHz)	Antenna Type	MAX Antenna Gain (dBi)
1	2412-2462	PIFA	1.72

5G wifi:

Antenna No.	Frequency Band	Antenna Type	Max Antenna Gain (dBi)
1	5150-5850	PIFA	2.57

2.8
Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as “Contains FCC ID: 2AC23-DT3C”; any similar wording that expresses the same meaning may be used.

2.9
Testing of the host product with all the transmitters installed – referred to as the composite investigation test- is recommended, to verify that the host product meets all the applicable FCC rules. The radio spectrum is to be investigated with all the transmitters in the final host product functioning to determine that no emissions exceed the highest limit permitted for any one individual transmitter as required by Section 2.947(f). The host manufacturer is responsible to ensure that when their product operates as intended it does not have any emissions present that are out of compliance that were not present when the transmitters were tested

individually.

If the modular transmitter has been fully tested by the module grantee on the required number of channels, modulation types, and modes, it should not be necessary for the host installer to re-test all the available transmitter modes or settings. It is recommended that the host product manufacturer, installing the modular transmitter, perform some investigative measurements to confirm that the resulting composite system does not exceed the spurious emissions limits or band edge limits (e.g., where a different antenna may be causing additional emissions).
The testing should check for emissions that may occur due to the intermixing of emissions with the other transmitters, digital circuitry, or due to physical properties of the host product (enclosure). This investigation is especially important when integrating multiple modular transmitters where the certification is based on testing each of them in a stand-alone configuration.

2.10
Any company of the host device which install this modular should perform the test of radiated & conducted emission and spurious emission etc. according to FCC Part 15C: 15.247 and 15.209 & 15.207, part 15 E 15.407,15B class B requirement, only if the test result comply with FCC part 15C: 15.247 and 15.209 & 15.207, part 15 E 15.407,15B class B requirement. Then the host can be sold legally.
The host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuity), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

2.11

The host manufacture is recommended to use FCC KDB 996369 D04 Module Integration Guide recommending as "best practice" RF design engineering testing and evaluation in case non-linear interactions generate additional non-compliant limits due to module placement to host components or properties.

2.12

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

Canada Statement

This device complies with Industry Canada’s license-exempt RSSs. Operation is subject to the following two conditions:
(1) This device may not cause interference; and
(2) This device must accept any interference, including interference that may cause undesired operation of the device.
Le présent appareil est conforme aux CNR d’Industrie Canada applicables aux appareils radio exempts de licence. L’exploitation est autorisée aux deux conditions suivantes :
(1) l’appareil ne doit pas produire de brouillage;
(2) l’utilisateur de l’appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d’en compromettre le fonctionnement.

Please notice that if the ISED certification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: “Contains IC: 12290A-DT3C” any similar wording that expresses the same meaning may be used.

l'appareil hôte doit porter une étiquette donnant le numéro de certification du module d'Industrie Canada, précédé des mots « Contient un module d'émission », du mot « IC: 12290A-DT3C» ou d'une formulation similaire exprimant le même sens, comme suit

1、the device for operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;

2、for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the e.i.r.p. limit;

3、for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p. limits as appropriate; and

1、les dispositifs fonctionnant dans la bande 5 150-5 250 MHz sont réservés uniquement pour uneutilisation à l’intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux;

2、le gain maximal d’antenne permis pour les dispositifs utilisant les bandes 5 250-5 350 MHz et5 470-5 725 MHz doit se conformer à la limite de p.i.r.e.;

3、le gain maximal d’antenne permis (pour les dispositifs utilisant la bande 5 725-5 825 MHz)doit se conformer à la limite de p.i.r.e. spécifiée pour l’exploitation point à point et non point à point, selon le cas.

The device meets the exemption from the routine evaluation limits in section 2.5 of RSS 102 and compliance with RSS-102 RF exposure, users can obtain Canadian information on RF exposure and compliance.
Le dispositif rencontre l'exemption des limites courantes d'évaluation dans la section 2.5 de RSS 102 etla conformité à l'exposition de RSS-102 RF, utilisateurs peut obtenir l'information canadienne surl'exposition et la conformité de rf.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

Cet émetteur ne doit pas être Co-placé ou ne fonctionnant en même temps qu'aucune autre antenne ouémetteur. Cet équipement devrait être installé et actionné avec une distance minimum de 20 centimètres entre le radiateur et votre corps.

This radio transmitter [IC: 12290A-DT3C] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.
The concrete contents to check are the following three points.

1) Antenna type is a PIFA Antenna with no more than 1.72 dBi gain at BT/BLE, 1.72 dBi for 2.4 G WIFI ,2.57 dBi gain for 5G WIFI.
2) Should be installed so that the end user cannot modify the antenna;
3) Feed line should be designed in 50ohm
Fine-tuning of return loss etc. can be performed using a matching network.

Le présent émetteur radio [IC: 12290A-DT3C] a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur.
Le contenu concret à vérifier sont les trois points suivants.
1) Le type d'antenne est une antenne PIFA avec un gain ne dépassant pas 1,72 DBI sous BT / ble, 1,72 DBI pour le wifi 2,4 G et 2,57 DBI pour le wifi 5G.
2) doivent être installés de façon que l'utilisateur final ne peut pas modifier l'antenne
3) La ligne d'alimentation doit être conçue en 50ohm
Le réglage précis de la perte de rendement, etc. peut être effectué en utilisant un réseau correspondant..

Antenna type and antenna gain:
BLE/BT:

Antenna	Frequency (MHz)	Antenna Type	MAX Antenna Gain (dBi)
1	2402-2480	PIFA	1.72

2.4 G wifi:

Antenna	Frequency (MHz)	Antenna Type	MAX Antenna Gain (dBi)
1	2412-2462	PIFA	1.72

5G wifi:

Antenna No.	Frequency Band	Antenna Type	Max Antenna Gain (dBi)
1	5150-5850	PIFA	2.57

Notice to OEM integrator

Must use the device only in host devices that meet the FCC/ISED RF exposure category of mobile, which means the device is installed and used at distances of at least 20cm from persons.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
The end user manual shall include FCC Part 15 /ISED RSS GEN compliance statements related to the transmitter as show in this manual(FCC/Canada statement).

Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B, ICES 003.
Host manufacturer is strongly recommended to confirm compliance with FCC/ISED requirements for the transmitter when the module is installed in the host.

The use condition limitations extend to professional users, then instructions must state that this information

also extends to the host manufacturer's instruction manual.

Host manufacturer is strongly recommended to confirm compliance with FCC/ISED requirements for the transmitter when the module is installed in the host.
Must have on the host device a label showing Contains FCC ID: 2AC23-DT3C or IC: 12290A-DT3C
Both FCC ID and IC ID are not to be placed on the host at the same time and only hosts going into the US can use the FCC ID and only hosts going into Canada can use the IC ID.

Installer should put it in the manual：
The device for operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems.

l'hôte doit utiliser l'instrument uniquement dans des dispositifs qui répondent à la fcc / (catégorie d'exposition rf mobile, ce qui signifie le dispositif est installé et utilisé à une distance d'au moins 20 cm de personnes.
le manuel de l'utilisateur final doit inclure la partie 15 / (fac rss gen déclarations de conformité relatives à l'émetteur que de montrer dans ce manuel.
le fabricant est responsable de la conformité de l'hôte, le système d'accueil avec le module installé avec toutes les autres exigences applicables du système comme la partie 15 b, ices - 003.
accueillir le fabricant est fortement recommandé de confirmer la conformité avec les exigences de la fcc / (émetteur lorsque le module est installé dans l'hôte.

le dispositif d'accueil doivent avoir une étiquette indiquant contient FCC ID: 2AC23-DT3C, IC: 12290A-DT3C

Les personnes chargées de l'installation devraient figurer dans le manuel:
Les dispositifs fonctionnant dans la bande de 5 150 à 5 250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux.

Doit avoir sur l'appareil hôte une étiquette indiquant Contient l'ID FCC 2AC23-DT3C ou IC : 12290A-DT3C L'ID FCC et l'ID IC ne doivent pas être placés sur l'hôte en même temps et seuls les hôtes se rendant aux États-Unis peuvent utiliser l'ID FCC et seuls les hôtes se rendant au Canada peuvent utiliser l'ID IC.

No shield test according to KDB996369 D01

This module does not contain a shield and therefore is limited. The host integrator may work with the Grantee to file a Class II Permissive Change for each host specific installation.

When considering the module is installed in a host:

1. The transmitter's power is measured as conducted, and if the C2/C3 PC investigation indicates that the module's power has increased from the original filing test report, the host integrator must investigate to determine if the initial module tested in a standalone module was improperly granted. The module may require a new FCC ID. An inquiry can be submitted to review a specific case, but the C2/C3 PC can only be given once the issue is resolved.

2. An increase in measured field strength over the module's tested field strength is the result of host installation, such as signal reflections, and this increased field strength value remains compliant with the rules. In that case, a statement is required in the end product test report indicating that "an increase in field strength.

3. Any radiated emission that does not comply with regulations must be corrected, and the C2/3PC can only be granted once the issue is resolved.

The following testing should be performed to demonstrate continued compliance:
1. Confirm and document the continued compliance for the fundamentals for each band under each specific rule part granted for the module.
2. The test shall demonstrate each band's worst-case modulation mode(s).
3. Test Band edge compliance for the widest and narrowest bandwidths per modulation type.
4. Include radiated spurious emissions with the antenna connected. Testing shall be performed for each

supported modulation teasing 15.31(m). In all cases, a test of each modulation is required for channels over the frequency range defined in 15.33(a) for unlicensed transmitters and 2.1057(a) for licensed transmitters.
5. Confirm and demonstrate with the radiated test that no additional parasitic, non-compliant emissions exist due to ingress (parasitic oscillations, radiation of stray signals within a host, etc.) are present.
6. These tests can be based on C63.10 and C63.26 as guidance.

Test plan:
1. The Module is BT&Wi-Fi device that support BLE/BT/802.11b/g/a/n (Wi-Fi 5 modes) all support a plethora of modulations (GFSK, Π/4DQPSK, 8DPSK, DSSS, OFDM), bandwidths, and data rates. Testing may be documented for a limited selection of BLE 1M (1Mbps), BLE 2M (2Mbps), BT 8DPSK (3Mbit/s), WIFI 2.4G 802.11b 1Mbps (BW 20MHz), WIFI 2.4G 802.11n HT40 MCS0 (BW 40MHz), WIFI 5G 802.11a 6Mbps (BW 20MHz), WIFI 5G 802.11n HT20 MCS0 (BW 20MHz), WIFI 5G 802.11n HT40 MCS0 (BW 40MHz) modes as worst-case.

Test items are as follows for reference:

Test items	Worst case mode and standards			
	BLE (2Mbps)	BT(8DPSK)	WIFI 2.4G (802.11b mode 1Mbps, 802.11n HT40 mode MCS0)	WIFI 5G (802.11a mode 6Mbps, 802.11ac VHT80 mode MCS0)
Conduced output power	☒ 15.247(b)	☒15.247(b)	☒15.247(b)	☒15.407 (a)
Power Spectral Density	☒15.247(e)	☒15.247(e)	☒15.247(e)	☒15.407 (a)
Radiated Band edge and Spurious Emission	☒15.247 (d), 15.205, 15.209	☒15.247 (d), 15.205, 15.209	☒15.247 (d), 15.205, 15.209	☒15.407 (b), 15.205, 15.209
AC Power Line Conducted Emissions Voltage	☒15.207(a)	☒15.207(a)	☒15.207(a)	☒15.207(a)
Antenna Requirement	☒15.203 15.247 (c)	☒15.203 15.247 (c)	☒15.203 15.247 (c)	☒15.203 15.407 (a)

2. The worst cases mode are as follows for reference:

Technology	Maximum conducted output power	Maximum power spectral density	Worst case mode	Test channel	Remark
BLE	BLE 2M: 6.93dBm	BLE 1M: -7.13 dBm/3kHz	BLE (1Mbps) BLE (2Mbps)	LCH, MCH, HCH	/
BT	3DH5: 6.26dBm	/	BT(8DPSK)	LCH, MCH, HCH	/
WIFI 2.4G	11B: 20.23dBm	11B: -10.56 dBm/3kHz	WIFI 2.4G (802.11b mode 1Mbps)	LCH, MCH, HCH	With highest power and highest power spectral density
			WIFI 2.4G (802.11n HT40 mode MCS0)	LCH, MCH, HCH	With widest bandwidth
WIFI 5G UNII-1	11N40SISO: 16.22dBm	11N20SISO: 6.16 dBm/MHz	WIFI 5G UNII-1 (802.11 HT20 mode MCS0)	LCH, MCH, HCH	With highest power spectral density
			WIFI 5G UNII-1 (802.11n HT40 mode MCS0)	LCH, MCH, HCH	With highest power and widest bandwidth
WIFI 5G UNII-2a	11A: 16.35dBm	11A: 6.16 dBm/MHz	WIFI 5G UNII-2a (802.11a mode 6Mbps)	LCH, MCH, HCH	With highest power and highest power spectral density
			WIFI 5G UNII-2a (802.11n HT40 mode MCS0)	LCH, MCH, HCH	With widest bandwidth
WIFI 5G UNII-2c	11N20SISO: 12.43dBm	11A: 2.35 dBm/MHz	WIFI 5G UNII-2c (802.11a mode 6Mbps)	LCH, MCH, HCH	With highest power spectral density
			WIFI 5G UNII-2c (802.11 HT20 mode MCS0)	LCH, MCH, HCH	With highest power
			WIFI 5G UNII-2a (802.11n HT40 mode MCS0)	LCH, MCH, HCH	With widest bandwidth
WIFI 5G UNII-3	11A: 17.34dBm	11A: 4.32 dBm/500kHz	WIFI 5G UNII-3 (802.11a mode 6Mbps)	LCH, MCH, HCH	With highest power and highest power spectral density
			WIFI 5G UNII-3 (802.11n HT40 mode MCS0)	LCH, MCH, HCH	With widest bandwidth

According to KDB 996369 D01:
The widest bandwidth, highest aggregate power, and highest power spectral density should be tested.

According to KDB 178919 D01:
Conducted power of host should be equal to or less than the maximum power of Module's.
An increase in maximum output power requires a new grant of certification (FCC ID) per § 2.1043. This includes an increase in conducted output power and/or radiated power listed on the grant.

3. For Antenna Requirement, the modular transmitter must comply with the antenna and transmission system requirements of §§ 15.203.
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

4. The modular transmitter has its own power supply regulation.
Testing is performed to show that the system has stability over voltage and temperature variation. Please refer to the test result of 15.407 Frequency stability.

5. The host supplies regulated power to the module.
   Minimum Operating Voltage: 2.93 VDC
   Maximum Operating Voltage: 3.63 VDC